

Interview

研究者として 教育者として

1 What do you think are key policies or technologies to promote future research in your field?

The field of hydrogen fuel production using photo-chemical or photo-electrochemical methods is already a well-developed area in terms of understanding of the basic principles and the role and requirements to the materials and chemistry involved. However, the “perfect” materials and devices are still to be found and developed and that is where our current research is focused. By extending the photon absorbing and catalytic part of the device-structure to include organic conjugated macromolecules we are exploring novel possibilities in the field.

The drive to get from the current level of understanding to efficient and cost effective full-scale devices is encouraged by the increasing prices on fossil fuel and the unquestionable increase in CO₂ levels in the atmosphere and in our oceans. Without doubt a scalable and cheap, solar powered hydrogen generation method would alter the global energy landscape – and the technologies for using hydrogen as fuel are already well developed.

Very significant government and industry supported research and development programs around the world in the areas of wind turbines and photovoltaics have helped these technologies to advance into commercially competitive methods for *electricity* production. A similar support effort in the area of *fuel* production directly from sunlight has not been established yet and is indeed crucial for the critical leap from the laboratories to large scale hydrogen production.

2 What do you think is important to educating graduating school students?

When students reach the graduate level they have usually been receiving education for about 15 years. So what more remains important to add to their knowledge? Surely we can keep adding more sophisticated subjects and instruction in their field – and that is indeed a part of the post-graduate education to become experts, but is it the most important one? The problem is that *after* the post-graduate education there will still be new subjects for the students to explore and learn. So “learning how to learn” is extremely important and in particular to be *fast* at learning. The speed of changes in technologies, communication, corporation and collaboration is now requiring that our current students are relying on *life-long learning* to become and remain leaders in their field and in their occupation.

3 Please write a message or give advises to current and prospective students in the program to be a global leader.

Graduate students, in their transfer between pure knowledge learning and operational professional individuals, surely need to further increase their level of theory and skills in their field. However, for becoming successful as leading figures in academia, in the public or private sector they need to embrace the broader aspects of their role in the current and future society. Globalization is a matter of fact and Japan is indeed a part of it. Take the small province of Prachin Buri in Thailand with a population of about half a million people – I presume that you may never have heard of it. Here more than 75 Japanese companies have established production of all kinds, from copy-paper to powertrains for cars, with more than 12,500 employees and significant success. Surprized? One should not be, this is the true picture of global operation already established. All students have to prepare themselves for facing this situation and understand the dynamics, advantages and indeed limitations involved. How are your skills in Thai language? (Or English for that matter?), have you established an international network with experts in your field so you can easier gain insights in local and global conditions? And do you have the knowledge to evaluate decisions (for your employer) in your field from a global perspective? Tasks like these are not trivial and cannot be limited to the time-frame of a formal education but is part of the “life-long-learning” which will characterize the future global leaders. However, the foundation for developing and managing this 2nd skill-set can, and should be initiated early in the career and the “Energy Next” graduate program is aiming for doing exact that.

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He is currently Professor at Department of Advanced Science and Engineering, Waseda University. He received his PhD in Chemical Engineering in 2005 from Technical University of Denmark (DTU). In 2005 he was appointed as a Researcher of University of Wollongong, Australia. In 2006 he moved to Monash University to continue his postdoctoral studies and was promoted to Associate Professor in 2010.